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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,062	08/18/2003	John R. Richards	4094-009	4152

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EXAMINER	
WONG, EDNA	

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/643,062	RICHARDS ET AL.	
	Examiner	Art Unit	
	Edna Wong	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,13,14 and 16-18* is/are rejected.

7)☒ Claim(s) *12 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Specification

The disclosure is objected to because of the following informalities:

page 1, line 7, the words -- , now abandoned, -- should be inserted after the year "2002".

page 1, line 8, the words -- , now US Patent No. 6,541,677, -- should be inserted after the year "2001".

page 1, line 9, the words -- , now US Patent No. 6,770,174 -- should be inserted after the year "2002".

page 11, line 22, a -- . -- (period) should be inserted after the word "bed".

page 16, line 18, the word "exchanger" should be amended to the word -- exchangers --.

page 20, line 22, "NO2" should be amended to -- NO_2 --.

page 22, line 23, the words "depicts feed a line" should be amended to the words -- depicts a feed line --.

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

Claims **1-11, 13-14 and 16-18** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

line 4, it appears that the "ammonia" is the same as that recited in claim 1, line 1. However, it is unclear if it is.

If it is, then it is suggested that the word -- the -- be inserted after the word "from".

Claim 2

line 1, it appears that the "NO_x" is the same as that recited in claim 1, line 2 or 5. However, it is unclear if it is.

If it is, then it is suggested that the word -- the -- be inserted after the word "wherein".

Claim 6

lines 1-2, it appears that "irradiating the ammonia" is further limiting the irradiating the gas stream recited in claim 1, lines 1-2. However, it is unclear if it is.

If it is not, then what is the difference between irradiating the ammonia and irradiating the gas stream?

And if it is not, then it is suggested that the word "including" be amended to the words -- further comprising --.

line 2, it appears that the "light" is the same as the UV light recited in claim 1, line 2. However, it is unclear if it is.

Claim 7

line 1, it appears that "removing particulate matter" is further limiting the method recited in claim 1. However, it is unclear if it is.

If it is, then it is suggested that the word "including" be amended to the words -- further comprising --.

line 2, "irradiating the ammonia in the gas stream" lacks antecedent basis. Is this the same as "irradiating the gas steam with UV light" recited in claim 1, lines 1-2?

line 2, it appears that the "irradiating" is the same as the irradiating recited in

claim 1, lines 1-2. However, it is unclear if it is.

Claim 9

line 1, it appears that "filtering particulate matter" is further limiting the method recited in claim 1. However, it is unclear if it is.

If it is, then it is suggested that the word "including" be amended to the words – further comprising --.

lines 2-4, it appears that at least one of the stages of the two-stage irradiation process is further limiting the irradiating the gas recited in claim 1, lines 1-2. However, it is unclear if it is.

If it is not, then there are three irradiating steps presently claimed: (1) irradiating the gas stream with UV light (from claim 1, lines 1-2); (2) one irradiation stage (from claim 9, lines 2-3); and (3) the second irradiation stage (from claim 9, lines 3-4). However, it is unclear if this is the case.

Claim 10

line 3, it appears that the "ammonia" is the same as that recited in claim 1, line 1. However, it is unclear if it is.

If it is, then it is suggested that the word -- the -- be inserted after the word "involving".

Claim 13

lines 1-2, it appears that "irradiating the ammonia" is further limiting the irradiating the gas stream recited in claim 12, lines 10-12. However, it is unclear if it is.

If it is not, then what is the difference between irradiating the ammonia and irradiating the gas stream?

And if it is not, then it is suggested that the word "including" be amended to the words -- further comprising --.

line 2, it appears that the "light" is the same as the UV light recited in claim 12, line 10. However, it is unclear if it is.

Claim 14

line 1, it appears that "removing particulate matter" is further limiting the method recited in claim 12. However, it is unclear if it is.

If it is, then it is suggested that the word "including" be amended to the words -- further comprising --.

line 2, "the ammonia in the gas stream being subjected to irradiation" lacks antecedent basis.

line 2, it appears that the "irradiation" is the same as the irradiating recited in

claim 12, lines 10-12. However, it is unclear if it is.

Claim 16

line 1, it appears that "filtering particulate matter" is further limiting the method recited in claim 12. However, it is unclear if it is.

If it is, then it is suggested that the word "including" be amended to the words -- further comprising --.

lines 2-4, it appears that at least one of the stages of the two-stage irradiation process is further limiting the irradiating the gas recited in claim 12, lines 10-12. However, it is unclear if it is.

If it is not, then there are three irradiating steps presently claimed: (1) irradiating the gas stream with UV light (from claim 12, lines 10-12); (2) one irradiation stage (from claim 16, lines 2-3); and (3) the second irradiation stage (from claim 16, lines 3-4). However, it is unclear if this is the case.

Claim 17

line 2, it appears that the "ammonia" is the same as that recited in claim 12, line 11. However, it is unclear if it is.

If it is, then it is suggested that the word -- the -- be inserted after the word "involving".

Claim 18

line 3, it appears that the "ammonia" is the same as that recited in claim 12, line 11. However, it is unclear if it is.

If it is, then it is suggested that the word -- the -- be inserted after the word "with".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **1-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Stevens** (US Patent No. 4,416,748).

Stevens teaches a method for removing ammonia from a gas stream comprising:

(a) irradiating the gas stream (= flue gases) with UV light (col. 1, lines 10-12); and

(b) disassociating hydrogen atoms from ammonia to form NH_2 (col. 1, lines 13-15); and

(c) reacting the NH_2 with NO_x to form N_2 and H_2O (col. 1, lines 16-25).

The NO_x includes NO and NO_2 (col. 1, lines 16-25).

The gas stream includes an initial NO_x concentration upstream from the location where the gas stream is irradiated and a succeeding NO_x concentration at or down stream from the area where the gas stream is irradiated (col. 7, lines 20-26).

The method includes irradiating the ammonia within the gas stream with light in the spectral range of 200 to 370 nm (= about 190 to about 220 nm) [col. 1, lines 33-35].

The method includes removing particulate matter from the gas stream prior to irradiating the ammonia in the gas stream (= electrostatic precipitator) [col. 5, lines 35-40; and Fig. 1].

The intensity of the irradiation falls in the range of 100-2,000 microwatts per square centimeter (= about 10^{18} to 10^{19} photon/cm^2) [col. 7, lines 29-33].

The disassociated hydrogen atoms form H_2O and hydroperoxy free radicals, and wherein the formed hydroperoxy free radicals continue to initiate oxidation reactions involving ammonia (*inherent*) [col. 1, lines 13-25, Equations (1), (2) and (3)].

The disassociated hydrogen atoms form H_2O and hydroperoxy free radicals (*inherent*) [col. 1, lines 13-25, Equations (1), (2) and (3)].

Stevens does not teach maintaining a NO_x concentration in the gas stream at a concentration level sufficient to maintain in the gas stream an active set of free radical chain reactions.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Stevens by maintaining a NO_x concentration in the gas stream at a concentration level sufficient to maintain in the gas stream an active set of free radical chain reactions

because Stevens teaches that sensors are located in the duct and in the stack, the former sensors being responsive to *the concentrations* of SO_2 and/or NO_x and serving to increase the rate of addition of NH_3 as the concentrations of SO_2 and/or NO_x increase (col. 5, line 60 to col. 6, line 2). Thus, this teaching would have suggested to one having ordinary skill in the art that the NO_x concentration in the gas stream was maintained at a concentration level. This concentration level would have been sufficient to maintain in the gas stream an active set of free radical chain reactions because the process is continuous (= the process is *applied to a flowing stream of the gas*) [col. 1, lines 39-40].

As to wherein the NO_2/NO concentration ratio is maintained generally at a value of less than 10, Stevens teaches a similar process. Similar processes can reasonably be expected to yield similar results, unless proven otherwise

As to wherein the set of free radical reactions involve NO_x, carbon monoxide, hydrocarbons, water vapor, and ammonia, Stevens teaches a similar process. Similar processes can reasonably be expected to yield products which inherently have the same properties. *In re Spada* 15 USPQ 2d 1655 (CAFC 1990); *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155 (CCPA 195).

As to wherein the succeeding NO_x concentration is at least 50% of the initial NO_x concentration, Stevens teaches that percentage reductions of NO_x that will be required

in any given case will depend on the initial concentrations of NO_x present in the flue gas and the levels of NO_x concentration that is desired to achieve in stack gas passed to the atmosphere (col. 7, lines 20-26). Thus, this teaching would have suggested to one having ordinary skill in the art that the succeeding NO_x concentration is a variable that depends on what one having ordinary skill in the art would have desired to achieve.

As to filtering the particulate matter from the gas stream and providing a two-stage irradiation process where one irradiation stage is employed prior to filtering the particulate matter and the second irradiation stage is employed after filtering the particulate matter, the repetition of the irradiating step to provide the same results is within the skill of one having ordinary skill in the art. The concept of duplication is not patentable. *St. Regis Paper Co. v. Bemis Co. Inc.*, 193 USPQ 8, 11 (7th Cir. 1977). While this decision relates to the duplication of parts, there is no reason why such duplication cannot be extended to a process step.

Furthermore, Stevens teaches one irradiation stage employed prior to filtering the particulate matter (Fig. 1a) and one irradiation stage employed after filtering the particulate matter (Fig. 1).

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Claims **12-18** define over the prior art of record because the prior art does not teach or suggest a method of producing cement and removing ammonia from a gas stream produced, comprising the steps of (a) directing, (b) directing, (c) heating, and (d) irradiating as presently claimed, esp., the steps of (a) directing a raw feed into a pyroprocessing system of a cement manufacturing facility, and heating the raw feed as the raw feed moves through the pyroprocessing system, (b) directing the heated raw feed through at least one kiln that forms a part of the pyroprocessing system to produce cement clinker, and (c) heating the pyroprocessing system and directing the resulting gas stream through the pyroprocessing system.

The prior art does not contain any language that teaches or suggests the above. *Stevens* does not teach the steps of (a) directing a raw feed into a pyroprocessing system of a cement manufacturing facility, and heating the raw feed as the raw feed moves through the pyroprocessing system, (b) directing the heated raw feed through at least one kiln that forms a part of the pyroprocessing system to produce cement clinker, and (c) heating the pyroprocessing system and directing the resulting gas stream through the pyroprocessing system. Therefore, a person skilled in the art would not have been motivated to adopt the above conditions, and a prima facie case of obviousness cannot be established.

Claims 13-14 and 16-18 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 3:30 pm, Flex Schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edna Wong
Primary Examiner
Art Unit 1753

EW
January 21, 2005